

CLAIMS

1. Fractionatable polydisperse stable double emulsion of the water-in-oil-in-water type consisting of 50 to 95% by weight, with respect to the total weight of the double emulsion, of droplets of a monodisperse inverse emulsion Ei dispersed in a continuous aqueous phase;

- the continuous aqueous phase comprising a polysaccharide thickening agent at 1 to 10% by weight with respect to the total weight of the continuous aqueous phase; a water-soluble sequenced copolymer of ethylene oxide and propylene oxide as surfactant; and an osmotic pressure balancing agent;

- the emulsion Ei having a viscosity less than or equal to the viscosity of the continuous aqueous phase and consisting of 50 to 95% by weight, with respect to the total weight of Ei, of droplets of an internal aqueous phase dispersed in an oily phase;

- the internal aqueous phase comprising at least one hydrophilic active substance;

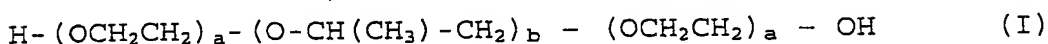
- the oily phase comprising polyglycerol polyricinoleate as surfactant.

2. Double emulsion according to Claim 1, characterised in that it comprises at least 60% by weight of droplets of emulsion Ei with respect to the total weight of the double emulsion.

3. Double emulsion according to any one of the preceding claims, characterised in that the agent for balancing the osmotic pressure is glucose.

4. Double emulsion according to any one of the preceding claims, characterised in that the polysaccharide thickening agent is an alginate, preferably an alginate having a molar mass of between 3000 and 6000 g/mol.

5. Double emulsion according to any one of the preceding claims, characterised in that the formula of the sequenced copolymer is:



in which

a is an integer between 50 and 120; and

b is an integer between 20 and 100.

6. Double emulsion according to Claim 5, characterised in that the continuous aqueous phase comprises 1 to 5% by weight, with respect to the total weight of the continuous aqueous phase, of alginate, preferably an alginate having a molar mass of between 3000 and 6000 g/mol, as a thickener; and 3 to 10% by weight with respect to the total weight of the continuous aqueous phase of the sequenced polymer of formula (I) as defined in Claim 5, as a surfactant.

7. Double emulsion according to any one of the preceding claims, characterised in that the continuous aqueous phase comprises glucose as osmotic pressure balancing agent, the

molar ratio of the glucose concentration in the continuous aqueous phase to the concentration of active substance in the internal aqueous phase being between 1.5 and 2.5.

8. Double emulsion according to any one of the preceding claims, characterised in that the oily phase comprises 60 to 90% by weight of polyglycerol polyricinoleate and 1 to 40% by weight dodecane.

9. Double emulsion according to any one of the preceding claims, characterised in that Ei comprises at least 60% by weight of droplets of internal aqueous phase.

10. Method of preparing a monodisperse stable double emulsion of the water-in-oil-in-water type, characterised in that a polydisperse double emulsion according to any one of Claims 1 to 9 is subjected to a controlled shearing so that the same maximum shearing is applied to all the emulsion.

11. Method according to Claim 10, characterised in that the controlled shearing is effected by bringing the said polydisperse double emulsion into contact with a moving solid surface, the velocity gradient characterising the flow of emulsion being constant in a direction perpendicular to the said moving solid surface.

12. Method according to any one of Claims 10 to 11, characterised in that the maximum value of the shearing level is 1 to 1.10^5 s^{-1} , preferably 100 to 5000 s^{-1} .

13. Method according to any one of Claims 10 to 12, characterised in that the shearing is effected by means of a

cell consisting of two concentric cylinders rotating with respect to each other.

14. Method according to any one of Claims 10 to 13, characterised in that the shearing is effected by means of a cell consisting of two moving parallel plates oscillating with respect to each other.

15. Method according to any one of Claims 10 to 14, characterised in that the shearing is effected by means of a cell consisting of two concentric discs rotating with respect to each other.

16. Monodisperse stable double emulsion of the water-in-oil-in-water type, consisting of 50 to 95% by weight, with respect to the total weight of double emulsion, of droplets of a monodisperse inverse emulsion E_i dispersed in a continuous aqueous phase;

- the continuous aqueous phase comprising a polysaccharide thickening agent at 1 to 10% by weight with respect to the total weight of the continuous aqueous phase; a water-soluble sequenced copolymer of ethylene oxide and propylene oxide as surfactant; and an osmotic pressure balancing agent;

- the emulsion E_i having a viscosity less than or equal to the viscosity of the continuous aqueous phase and consisting of 50 to 95% by weight, with respect to the total weight of E_i , of droplets of an internal aqueous phase dispersed in an oily phase;

- the internal aqueous phase comprising at least one hydrophilic active substance;

- the oily phase comprising polyglycerol polyricinoleate as surfactant.

17. Emulsion according to Claim 16, characterised in that the mean diameter of the droplets of emulsion E_i is between 1 and 10 μm .